potentially interfered with. Step C is optional, as some predetermined number of channels (including possibly a guard band of channels) may always be identified based on the required mobile station 100 transmit frequency. In any case, at Step D the MCU 120 communicates with the BT host 300, and as a result of the communication the Baseband layer of the Bluetooth protocol stack adjusts the frequency hopping pattern accordingly, and transmits the altered frequency hopping pattern to the Bluetooth devices 302A and 302B using a suitable signaling protocol that is defined for this purpose. At Step E the Bluetooth subsystem 304 continues operation with the modified frequency hopping pattern, and interference from the transmitter 210 of the mobile station 100 is thus avoided as received signals at the co-located Bluetooth host 300 are not interfered with by the transmission from the transmitter 210 of the mobile station 100.

The alteration of the frequency hopping pattern can be done in a number of ways. For example, a block of *n* contiguous barred channels may identified and removed from the set of 79 channels such that the resulting frequency hopping pattern never encounters the *n* barred channels. Further by example, the full set of 79 channels may be used by the frequency hopping algorithm, but when one of the *n* barred channels is selected to be the next channel to hop to, the frequency hop is made instead to another (non-barred) channel. In either example *n* may have a value in the range of one, such as when the mobile station transmitter 210 operates with a 30kHz bandwidth, to more than one, such as a value of four or greater when the mobile station transmitter operates with a 5MHz bandwidth. The end result is that the Bluetooth subsystem 304 does not use a frequency channel that may be experiencing interference from the harmonics or other spurious signals generated by the transmitter 210 of the mobile station 100, and the link quality is not degraded.

In a further embodiment of these teachings the MCU 120 does not communicate with the Bluetooth Host 300 to alter the frequency hopping pattern of the Bluetooth subsystem 304, but instead to inhibit the transmission of data in the Bluetooth subsystem 304 when a hopped-to frequency is determined to be a frequency that may be interfered with because of operation of the mobile station transmitter 210 on the currently specified frequency channel. In this embodiment the transmission of data is preferably also selectively inhibited as a function of a bandwidth of the currently specified frequency channel of the mobile station 100. More specifically, the transmission of data in the

Bluetooth subsystem 304 is inhibited for those cases where the currently specified mobile station transmit frequency channel is one having a harmonic frequency that lies in the ISM band. That is, if the hopped-to frequency is one that corresponds to the 3rd harmonic of the transmit frequency, and thus has the potential to be interfered with by the mobile station transmitter 210, then transmission of data within the Bluetooth subsystem 304 is halted or inhibited for the slot duration of the hopped-to frequency channel.

In this embodiment the transmission in the Bluetooth subsystem 304 may be inhibited by turning off a modulator 306 during the slot time of the hopped-to frequency channel, thereby not transmitting data, or the transmission may be inhibited by turning off the RF carrier of the Bluetooth transmitter 308 during the slot time of the hopped-to frequency channel, thereby also not transmitting data. The transmission of data may also be inhibited by simply transmitting random bits, or some predetermined pattern of bits (e.g., all zeroes, all ones, alternating ones and zeroes), instead of the actual data to be transmitted. At the end of the slot time of the hopped-to frequency channel, and when hopping to a next channel (assuming that the next channel is not also potentially interfered with), the transmission of data is resumed, such as by turning on the modulator 306 or the RF carrier of the transmitter 308, or by replacing the random or other bit pattern with actual data, and data transmission to the receiver of the Bluetooth Host 300 located at the mobile station 100 is once more initiated.

As in the embodiment of Fig. 3, and referring now to Fig. 4, the MCU 120 is assumed to have knowledge of both the current transmit channel of the mobile station 100 and the frequency hopping pattern of the Bluetooth subsystem 304. At Step A of this second embodiment the MCU 120 determines, when first coming to a new transmit channel, if there is a possibility that the 3rd harmonic of the signal to be transmitted can interfere with the operation of the Bluetooth subsystem 304. If the determination is negative, then operation continues in a normal fashion so as to transmit on the assigned channel (Step B). If the determination at Step A is positive, then at Step C the MCU may make a further determination, based on the bandwidth of the transmission, of how many Bluetooth subsystem 304 channels may be potentially interfered with. As in the embodiment of Fig. 3, Step C is optional, as some predetermined number of channels (including possibly a guard band of channels) may always be identified based on the required mobile station 100 transmit frequency. At Step D the MCU 120 communicates

with the Bluetooth Host 300, and as a result of the communication the Baseband layer of the Bluetooth protocol stack records the Bluetooth frequency channel(s) wherein transmission to the Bluetooth Host 300 is to be avoided, and transmits this information to the Bluetooth devices 302A and 302B using a suitable signaling protocol that is defined for this purpose. At Step E the Bluetooth subsystem 304 continues operation by avoiding transmission of data on the identified frequency channel(s), either by disabling the modulator 306 or the RF carrier of the Bluetooth transmitters 308, or by transmitting bits other than the bits of the actual data. Since the Bluetooth Host 300 has knowledge of on which channel or channels data will not be transmitted, it may disable its receiver for the slot duration, or it may simply ignore the output of the Bluetooth receiver. Thus, interference from the transmitter 210 of the mobile station 100 is avoided, as the received signals at the co-located Bluetooth host 300 are not interfered with by the transmission from the transmitter 210 of the mobile station 100.

In the embodiments of Figs. 3 and 4, and if the mobile station 100 is changing from a transmit frequency channel that resulted in the Bluetooth subsystem 300 having to alter the frequency hopping pattern or inhibiting data transmission, to a frequency channel that is deemed to be non-interfering, then appropriate signaling is employed to inform the component parts of the Bluetooth subsystem 300 that the previous transmission channel restrictions are removed.

While described in the context of presently preferred embodiments these teachings should not be construed to be limited to only these embodiments. For example, local RF communication schemes other than one based on the Bluetooth technique may be employed. In general, these teachings apply to other types of mobile station 100 air interfaces operating in a first frequency band that has the potential to interfere with an associated short range RF communication system that employs some type of frequency hopping or similar technique for communication within a second frequency band. Also, the described frequency bands and bandwidths are exemplary, and other types of single mode or multi-mode mobile stations may use other frequencies and/or bandwidths. Furthermore, while described in the context of the avoidance of the interference of the third harmonic of the cellular system transmission into the ISM band, depending on the frequency of operation other than the third harmonic may be of concern. In general, these teachings seek to avoid any known frequency or frequency component (spurious or